Performance test	Intermediate Bulk Container (IBC) type					
	Metal IBCs	Rigid plastic IBCs	Composite IBCs	Fiber-board IBCs	Wooden IBCs	Flexible IBCs
Vibration	[6] X	[6] X	[6] X	[6] X	[6] X	[1,5] X
Bottom lift	[2] X	X	X	X	X	
Top lift	[2] X	[2] X	[2] X			[2,5] X
Stacking	[7] X	[7] X	[7] X	[7] X	[7] X	[5] X
Leakproofness	[3] X	[3] X	[3] X			
Hydrostatic	[4] X	[3] X	[3] X			
Drop	[4] X	[4] X	[4] X	[4] X	[4] X	[5] X
Topple						[5] X
Righting						[2,5] X
Tear						[5] X

[1] Flexible intermediate bulk containers must be capable of withstanding the vibration test.
[2] This test must be performed only if intermediate bulk containers are designed to be handled this way. For metal intermediate bulk containers, at least one of the bottom lift or top lift tests must be performed.
[3] The leakproofness and hydrostatic pressure tests are required only for intermediate bulk containers intended to contain liquids or intended to contain solids loaded or discharged under pressure.
[4] Another intermediate bulk container of the same design type may be used for the drop test set forth in § 178.810 of this subchapter.
[5] Another different flexible intermediate bulk container of the same design type may be used for each test.
[6] The vibration test may be performed in another order for intermediate bulk containers manufactured and tested under provisions of an exemption before October 1, 1994 and for non-DOT specification portable tanks tested before October 1, 1994, intended for export.
[7] This test must be performed only if the intermediate bulk container is designed to be stacked.

[Amdt. 178–108, 60 FR 40039, Aug. 4, 1995]

§ 178.810 Drop test.

(a) *General.* The drop test must be conducted for the qualification of all intermediate bulk container design types and performed periodically as specified in § 178.801(e) of this subpart.

(b) *Special preparation for the drop test.* (1) Metal, rigid plastic, and composite intermediate bulk containers intended to contain solids must be filled to not less than 95 percent of their capacity, or if intended to contain liquids, to not less than 98 percent of their capacity. Pressure relief devices must be removed and their apertures plugged or rendered inoperative.

(2) Fiberboard, wooden, and flexible intermediate bulk containers must be filled with a solid material to not less than 95 percent of their capacity.

(3) Rigid plastic intermediate bulk containers and composite intermediate bulk containers with plastic inner receptacles must be conditioned for testing by reducing the temperature of the packaging and its contents to –18 °C (0 °F) or lower. Test liquids must be kept in the liquid state. Anti-freeze should be used, if necessary.

(c) *Test method.* Samples of all intermediate bulk container design types must be dropped onto a rigid, non-resilient, smooth, flat and horizontal surface. The point of impact must be the most vulnerable part of the base of the intermediate bulk container being tested. Following the drop, the intermediate bulk container must be restored to the upright position for observation.

(d) *Drop height.* (1) For all intermediate bulk containers, drop heights are specified as follows:

(i) Packing Group I: 1.8 m (5.9 feet).

(ii) Packing Group II: 1.2 m (3.9 feet).

(iii) Packing Group III: 0.8 m (2.6 feet).

(2) Drop tests are to be performed with the solid or liquid to be transported or with a non-hazardous material having essentially the same physical characteristics.

(3) The specific gravity and viscosity of a substituted non-hazardous material used in the drop test for liquids must be similar to the hazardous material intended for transportation. Water also may be used for the liquid drop test under the following conditions:

(i) Where the substances to be carried have a specific gravity not exceeding 1.2, the drop heights must be those specified in paragraph (d)(1) of this section for each intermediate bulk container design type; and

(ii) Where the substances to be carried have a specific gravity exceeding 1.2, the drop heights must be as follows:

(A) Packing Group I: SG × 1.5 m (4.9 feet).

(B) Packing Group II: SG × 1.0 m (3.3 feet).

(C) Packing Group III: SG × 0.67 m (2.2 feet).

(e) *Criteria for passing the test.* For all intermediate bulk container design types there may be no loss of contents. A slight discharge from a closure upon impact is not considered to be a failure of the intermediate bulk container provided that no further leakage occurs. A slight discharge (e.g., from closures or stitch holes) upon impact is not considered a failure of the flexible intermediate bulk container provided that no further leakage occurs after the intermediate bulk container has been raised clear of the ground.

§ 178.811 Bottom lift test.

(a) *General.* The bottom lift test must be conducted for the qualification of all intermediate bulk container design types designed to be lifted from the base.

(b) *Special preparation for the bottom lift test.* The intermediate bulk container must be loaded to 1.25 times its maximum permissible gross mass, the load being evenly distributed.

(c) *Test method.* All intermediate bulk container design types must be raised and lowered twice by a lift truck with the forks centrally positioned and spaced at three quarters of the dimension of the side of entry (unless the points of entry are fixed). The forks must penetrate to three quarters of the direction of entry. The test must be repeated from each possible direction of entry.

(d) *Criteria for passing the test.* For all intermediate bulk container design types designed to be lifted from the base, there may be no permanent deformation which renders the intermediate bulk container unsafe for transportation and no loss of contents.

§ 178.812 Top lift test.

(a) *General.* The top lift test must be conducted for the qualification of all intermediate bulk container design types designed to be lifted from the top or, for flexible intermediate bulk containers, from the side.

(b) *Special preparation for the top lift test.* (1) Metal, rigid plastic, and composite intermediate bulk container design types must be loaded to twice the maximum permissible gross mass.

(2) Flexible intermediate bulk container design types must be filled to six times the maximum net mass, the load being evenly distributed.

(c) *Test method.* (1) A metal or flexible intermediate bulk container must be lifted in the manner for which it is designed until clear of the floor and maintained in that position for a period of five minutes. For flexible intermediate bulk container design types, other methods of top lift testing and preparation at least equally effective may be used (see § 178.801(i)).

(2) Rigid plastic and composite intermediate bulk container design types must be:

(i) Lifted by each pair of diagonally opposite lifting devices, so that the hoisting forces are applied vertically, for a period of five minutes; and

(ii) Lifted by each pair of diagonally opposite lifting devices, so that the hoisting forces are applied towards the center at 45° to the vertical, for a period of five minutes.

(d) *Criteria for passing the test.* For all intermediate bulk container design types designed to be lifted from the top, there may be no permanent deformation which renders the intermediate bulk container, including the base pallets when applicable, unsafe for transportation, and no loss of contents.

§ 178.813 Leakproofness test.

(a) *General.* The leakproofness test must be conducted for the qualification of all intermediate bulk container design types and on all production units intended to contain liquids or intended to contain solids that are loaded or discharged under pressure.

(b) *Special preparation for the leakproofness test.* Vented closures must either be replaced by similar non-vented closures or the vent must be sealed. For metal intermediate bulk container design types, the initial test must be carried out before the fitting of any thermal insulation equipment.

(c) *Test method and pressure applied.* The leakproofness test must be carried out for a suitable length of time using air at a gauge pressure of not less than 20 kPa (2.9 psig). Leakproofness of intermediate bulk container design types